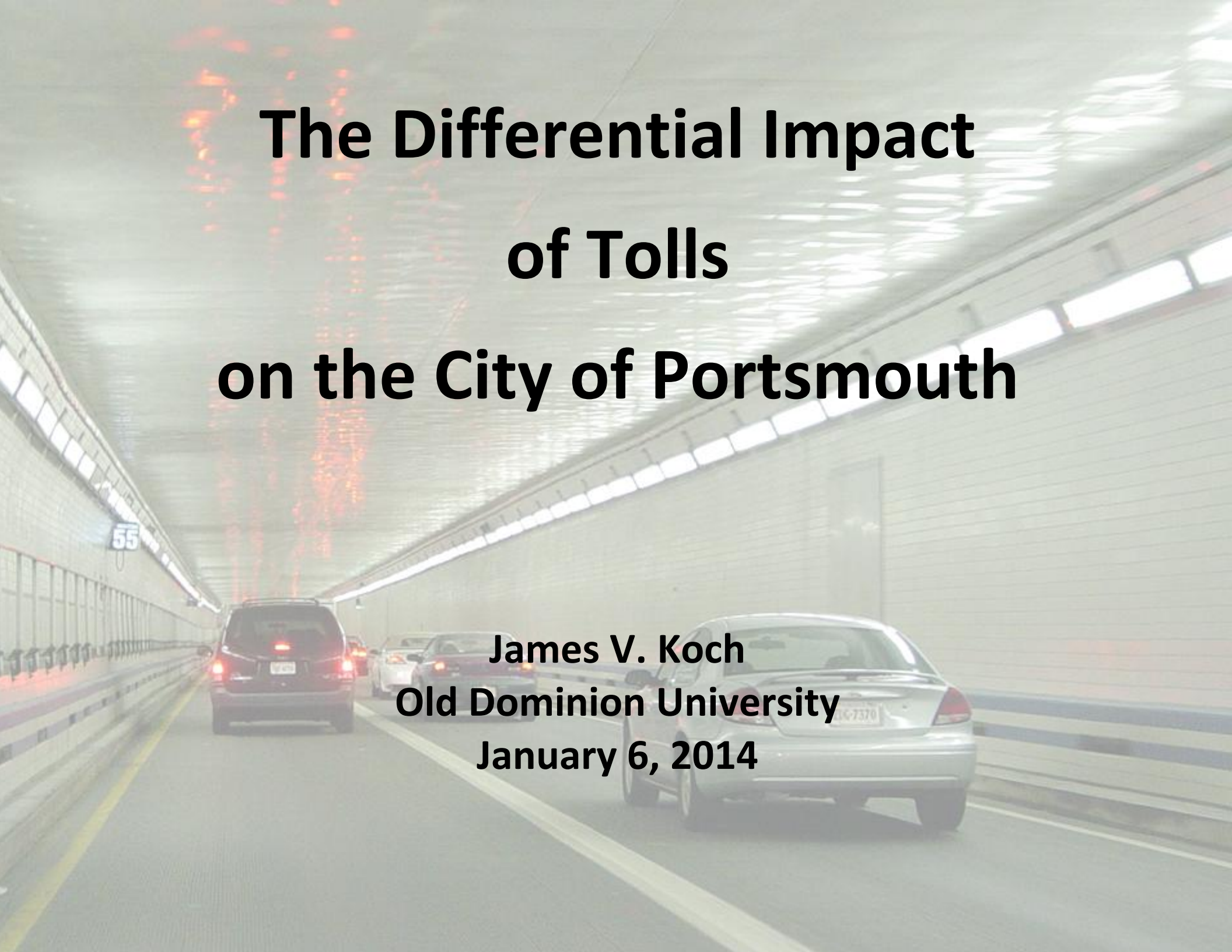

The Differential Impact of Tolls on the City of Portsmouth

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EXECUTIVE SUMMARY

This report examines the financial impacts of tolls that soon will be imposed on vehicles traveling through the Downtown (DTT) and Midtown (MTT) tunnels as well as over the Martin Luther King Freeway (MLK). This report concentrates upon the impact of those tolls on the City of Portsmouth---which paid for the report, but had no control over my analysis or conclusions.

Here are my major conclusions:

- **Hampton Roads is a highly interdependent region in which hundreds of thousands of individuals live in one city, but work in another.**
- **17,174 individuals live in Portsmouth, but work in Norfolk or Virginia Beach. On the other hand, 14,510 individuals live in Norfolk or Virginia Beach and commute into Portsmouth. Thus, 17,174 + 14,510 = 31,684 individuals go "in and out" of Portsmouth across the Elizabeth River daily to work and nearly all of them use the the Downtown Tunnel (DTT) and Midtown Tunnel (MTT) when they do so.**
- **Another 18,576 individuals made "in and out" job commuting trips to/from Portsmouth to locations in Hampton Roads other than Norfolk and Virginia Beach (for example, trips to and from Suffolk and Newport News, but only in rare instances will these individuals use the DTT and MTT tunnels to commute to/from their jobs.**
- **If one indexes the burden that tolls will impose on each city as a percent of its job base, then Portsmouth will be 8.48 times more affected than Virginia Beach, 6.1 times more than Norfolk, and 2.38 times more than Suffolk.**
- **A typical year's toll payments for a tunnel commuter residing in Portsmouth will require 2.14 percent of the median household income in Portsmouth, compared to 1.55 percent for the median household income in Virginia.**
- **Currently, approximately 125,000 vehicles use the DTT and MTT on an average day. About 50,000 of these vehicles involve "discretionary" drivers that are not commuting and are not connected to a business. It is these discretionary drivers whose behavior is most likely to be influenced by the tolls.**

- **Portsmouth restaurants and businesses that have regional clienteles will bear the brunt of any decline in discretionary driving. In effect, the tolls will have the impact of a five to ten percent tax on the prices paid by their discretionary customers.**
- **In the short-run, Portsmouth should expect a several million dollar decline in taxable sales in the City (a two percent decline translates to almost $12 million annually) and a possible two percent ($1.76 million) decline in assessed valuations. These effects will be spread unevenly across the City.**
- **In the long-term, the typical regional driver will pay the tolls because he/she places a higher value on his/her time than the cost of the peak time tolls.**
- **ERCO's agreement with the Commonwealth allows it to increase tolls 3.5 percent annually, or by the increase in the CPI for the trailing twelve months, *whichever is higher*. Based upon the behavior of the CPI over the past 54 years, this will increase the peak time passenger vehicle toll to $21.56 in 2070; the peak time truck toll will increase to $86.24 in the same year. Plausibly, ERCO will earn 82.8 percent more revenue between 2016 and 2070 because the availability of the CPI adjustment than it would have earned if tolls were limited only to 3.5 percent increases annually.**
- **The City of Portsmouth already is pursuing alternatives to specific, lump-sum Commonwealth funding that would reduce or delay the impact of the tolls. Three of the best possibilities include: (1) tax rebates, including state income tax rebates, of tolls paid; (2) increasing the number of tolling time periods from two to three or four; and, (3) enhanced and perhaps subsidized public transportation and City-sponsored and publicized, Internet-based ride-sharing programs.**

I. DEFINING THE NATURE OF THIS REPORT

This report examines the financial impacts of tolls that soon will be imposed on vehicles traveling through the Downtown (DTT) and Midtown (MTT) tunnels as well as over the Martin Luther King Freeway (MLK). More specifically, however, this report concentrates upon the impact of those tolls on the City of Portsmouth---which paid for the report, but had no control over my analysis or conclusions.

There are dozens of factors to consider when one attempts to assess the impact of new tolls upon a region or a city. Many of these impacts are economic/financial in nature and relate to the effects of tolls upon important variables such as the number of tunnel users, traffic congestion, commuter time saved, business and worker productivity, assessed valuations, and the prices of goods and services. Other impacts are more normative in character and attempt to assess the affordability of the tolls compared to users' incomes. While there is no hard and fast rule that tells us when tolls become "unaffordable," one can compare the apparent financial burden that tolls place upon the average citizen or household in the major cities of the region and I do this.

The window for the execution of this report was slightly less than one month. This was not sufficient time for me to undertake either a full economic impact study, or a complete benefit/cost analysis of the new tolls. There are simply too many moving parts in this tolling situation, too many important issues to consider, and too many requirements for data to do either type of study in the time allotted. Therefore, in this report, I often cite what other studies have found in roughly similar situations, or I review the reputable analyses of some of these issues that already have been completed for the new tunnel project. These include studies performed by the Virginia Department of Transportation,[1] the Hartgen Group,[2] the consulting firm Steer, Davies and Gleave,[3] the Economic Development Research Group for Steer, Davies and Gleave,[4] the consulting firm Arup USA,[5] and the consulting firm Moffatt and

[1] "Midtown Tunnel Corridor Project Toll Feasibility Study: Final Report," Virginia Department of Transportation, December 2007.

[2] "Value of Improvements in the Reliability of Travel Time resulting from MTT Improvements," The Hartgen Group (2009), www.hartgengroup.net and "Impacts of Mid-Town Tunnel Improvements on Regional Productivity and Job Mobility," The Hartgen Group (2009), www.hartgengroup.net.

[3] "Downtown Tunnel/Midtown Tunnel/Martin Luther King Freeway (MLK) Extension: Traffic and Revenue Forecasts," Steer, Davies and Gleave, 2010, and Final Report, March 2012.

[4] "Long-Range Socioeconomic Trend Expectation for Midtown Tunnel, Downtown Tunnel and MLK Extension Service Area, Hampton Roads, Virginia," Boston: Economic Development Research Group (October 15, 2010). Prepared for Steer, Davies and Gleave.

[5] "Technical Due Diligence Findings: Downtown Tunnel/Midtown Tunnel/MLK Extension," New York: Arup USA (March 27, 2012).

Nichols.[6] Except for Moffatt and Nichols, these studies are not Portsmouth-specific, but they do supply us with valuable information and analysis.

The most important "new" data in this report relate to my analysis of regional commuting patterns---where people live and where they work. Hampton Roads is a highly interdependent region in terms of many individuals choosing to live in one city, but work in another. I focus on Portsmouth and, in particular, upon individuals that will find it difficult not to pay the tolls because they live in Portsmouth and work in either Norfolk or Virginia Beach, or because they live in Norfolk or Virginia Beach and commute to work in Portsmouth.

II. THE SITUATION

A resident of Portsmouth would have to be a recluse not to be aware that tolls soon will be collected from those driving vehicles through the Downtown (DTT) and Midtown (MTT) tunnels as well as the newly extended Martin Luther King Freeway (MLK). During peak times, drivers of passenger vehicles through these tunnels will pay $1.84, while drivers of trucks will pay $7.36. During off-peak times, the tolls will be $1.59 and $4.77, respectively.[7] The MLK toll will be $.50 if a passenger vehicle uses either tunnel ($1.00 if it does not), and triple those rates for trucks. These are "E-Z Pass" toll rates and assume that the vehicles using these pathways will use the Commonwealth's electronic toll collection system. If not, then the effective prices triple.

The tolls are one product of a 58-year "Comprehensive Agreement" between the Commonwealth of Virginia and Elizabeth River Crossing OpCo (ERCO),[8] made possible under provisions of the 1995 Public-Private Transportation Act (PPTA).[9] The agreement took effect in 2012 and has been amended since then.

The Comprehensive Agreement with ERCO includes the construction of a second MTT tunnel tube (increasing it to four lanes), extending the Martin Luther King Freeway (MLK) from High Street to I-264, and rehabilitating the existing DTT and MTT tunnels. The advertised total cost of these projects is $2.16 billion. Figure 1 maps the most important physical parts of the project.

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[6] "City of Portsmouth Policy and Legislative Recommendations: Midtown and Downtown Tunnel Toll Implementation," Moffatt and Nichols, August 27, 2012.

[7] "Peak Time" has been defined as 5:30 a.m. to 9:00 a.m. and 2:30 p.m. to 7:00 p.m., Monday through Friday; all other hours during the week will be considered to be "Non-Peak Time."

[8] RC's lead firms are Skanska Infrastructure Development and Macquarie Group, both of whom are public-private partnership (PPP) developers and infrastructure investors as well as being operators throughout the world. For more information on ERCO, see www.erc-info.com.

[9] Among Virginia PPT projects that have been constructed are the Pocahontas Parkway (Route 895) across the James River south of Richmond; a 17.5-mile stretch of Route 288 west of Richmond; and, the Route 199 partial loops around Williamsburg.

The financing of the project is complicated: $442 million in a TIFIA loan[10] to ERCO from the U.S. Government; $675 million in proceeds from Private Activity Bonds; equity contribution of $272 million; $309 million in funds from various governmental units, including VDOT; $368 million in toll revenues; and, $43 million in TIFIA capitalized interest. The TIFIA loan will be repaid with toll revenues derived from the existing Midtown and Downtown Tunnels.

ERCO is responsible for collecting tolls and for achieving the traffic volumes outlined in its forecasts, which may be a bit optimistic. While there is no guaranteed rate of return for ERCO on its investment, ERCO is authorized to earn 13.5 percent on its invested capital. If that rate of return does not materialize because competing facilities have been constructed by the Commonwealth, then the Commonwealth must compensate ERCO for the shortfall. However, if ERCO's revenues exceed forecasts (implicitly, the 13.5 percent rate of return), then ERCO will share a portion of the excess with VDOT. The percentage share of excess gross revenues increases as the amount of gross revenues earned by ERC increases.[11] VDOT is required by law to use the shared revenue on transportation improvements in the corridor.

The Comprehensive Agreement gives ERCO the authority to raise tolls 3.5 percent annually if it wishes to do so, beginning in 2016. However, if the annual growth rate of the Consumer Price Index (CPI) in the preceding twelve months was higher than 3.5 percent, then ERCO may increase its tolls by that percentage, if it opts to do so. Assuming that ERCO takes advantage of these provisions, **this means, at a minimum, that the peak time and non-peak time tolls for passenger vehicles will rise to at least $11.79 and $8.71, respectively, by 2070. Comparable truck tolls will rise to at least $47.17 and $30.57, respectively, by 2070. In fact, because of the CPI provision, tolls are likely to rise much faster than 3.5 percent over the life of the agreement.**

This is not the appropriate place to debate either the wisdom or the constitutionality of the PPTA of the specific agreement with ERCO. Instead, this study focuses on the likely impact of the ERCO agreement and its associated tolls on the City of Portsmouth compared to other cities in Hampton Roads.

[10] TIFIA stands for the Transportation Infrastructure Finance and Innovation Act of 1998. The Act is designed as "*a Federal credit program for eligible surface transportation projects of regional or national significance under which the U.S. Department of Transportation may provide three forms of credit assistance – secured (direct) loans, loan guarantees, and standby lines of credit.*" http://www.fta.dot.gov/grants/12861.html.

[11] If gross revenues exceed baseline forecasts from 5% to 10%, 10% to 20%, 20% to 30% and in excess of 30%, then VDOT will share 5%, 15%, 30% and 60%, respectively. ERC may earn gross revenues up to 5% in excess of baseline forecasts before VDOT shares in profits.

Some Relevant History

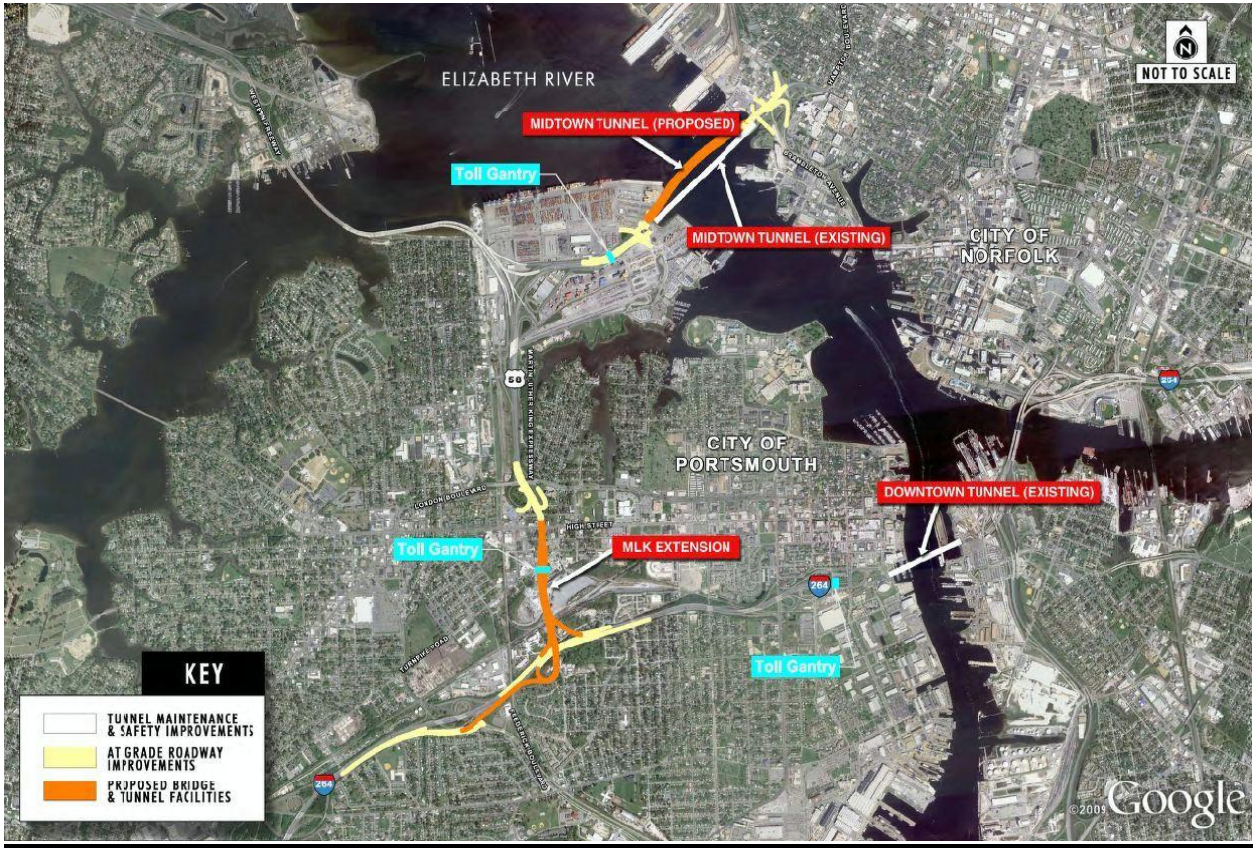
The first tunnel across the Elizabeth River between Portsmouth and Norfolk (the DTT) opened in 1952 and the second tunnel (the MTT) opened in 1962. The construction of both tunnels was financed by toll revenue bonds. In 1986, the tolls were removed.

The 1952 and 1962 introduction of tolls and their subsequent removal on August 1, 1986 initially would appear to provide some potential evidence concerning the impact of tolls on citizen behavior and economic activity. What happened to travel, population, sales, employment, etc., when the tolls were vacated? If the "end of tolls" occurred in a vacuum, then one could look at the effects of that change on the variables just named and draw strong conclusions. Unfortunately, too many other potentially relevant things were changing at the same time for us to be able to say anything precise. For example, Portsmouth's population has been drifting downward since the early 1970s and the declines continued even after tolls were eliminated. The dynamic growth of Virginia Beach both has supplied additional jobs and commuters to the region. There are far more registered vehicles now in Hampton Roads than there were 1952 through 1986. The Port has expanded significantly. Gasoline prices have increased, as have public transportation options. A detailed econometric study would be required to ferret out the influences of these factors upon DTT and MTT tunnel travel independent of tolls.

The bottom line is that one cannot simply focus on what happened to traffic volumes after DTT and MTT tolls were eliminated in 1986 in order to reach a conclusion about the impact of tolls on tunnel traffic volumes. It is tempting to do so, but the actual situation was much more complicated than this.

Figure 1

A Map of the Project: DTT, MTT and MLK Extension



Source: City of Portsmouth

III. FOCUS ON TRAVELERS

Perhaps the most important question relating to the re-imposition of tolls on the DTT and MTT tunnels and the MLK focuses upon the effects they will have upon mobile individuals and businesses---parties that have a choice about where they work and recreate. In addition to work, shopping, and recreating in their home city, any individuals may choose to: (1) live in one city and work in another; (2) live in one city and shop in another; and, (3) live in one city and patronize entertainment venues, restaurants, churches, beaches, etc., in another.

Businesses maintain most of the same options. In addition to purchasing all of their inputs, producing and selling goods and services in their home city, they may choose to: (1) purchase inputs, including the employees they hire, from another city; (2) sell their outputs in another city.

The critical data-related questions insofar as Portsmouth is concerned are these:

- How many citizens of Portsmouth travel outside of the city for whatever reason? When they do, how many of them will use the DTT and MTT tunnels, or the MLK**?**
- How many non-citizens of Portsmouth enter the city for whatever reason and use the DTT and MTT tunnels when they do so?
- What impacts will tolls have on these decisions, either directly (a driver who decides the toll is too high and stops driving through the DTT or MTT), or indirectly (tolls increase costs and these translate into higher prices for goods and services sold in Portsmouth, lower sales, reduced employment, and lower real estate values).
- Will the impact of tolls be greater on the City of Portsmouth than on other cities in Hampton Roads?

Who Uses the DTT and MTT Tunnels Now?

In 2011 (the most recent data year available), an average of 89,500 vehicles per day used the DTT, while an average of about 35,000 vehicles used the MTT.[12] What proportion of these vehicles involved individuals that were commuting to a job, in or out of Portsmouth?[13] Table 1 tells us that Portsmouth hosted 61,237 jobs in that year and 27.1 percent of those jobs (16,620) were held by

[12] Both Steer, Davies and Gleave (see footnote 3) and VDOT appear to agree on these traffic numbers.
[13] Appendix A supplies the percentages that are implied by the absolute job numbers in Table 1.

residents of Portsmouth.[14] The other 44,617 jobs (72.9 percent) hosted by Portsmouth were held by individuals commuting into Portsmouth from another city. Except for a few cases involving drivers from Chesapeake, only residents of Norfolk and Virginia Beach will have to pay tolls to enter Portsmouth. Residents of Suffolk and all points west, plus anyone living on the Peninsula and works in Portsmouth, will not have to pay the tolls unless they choose to drive in very unusual ways.

Table 2 isolates Norfolk and Virginia Beach, the two cities where nearly all individuals from those cities coming to or going from Portsmouth will have to pay the tolls. Table 2 reveals that 17,174 individuals live in Portsmouth, but work in Norfolk or Virginia Beach. On the other hand, 14,510 individuals live in Norfolk or Virginia Beach and commute into Portsmouth. Thus, 17,174 + 14,510 = 31,684 individuals go "in and out" of Portsmouth across the Elizabeth River daily to work.

Let's assume that each individual goes both back and forth daily; this means that there are 31,684 x 2 = 63,368 potential daily trips accounted for by these "in and out" job commuters that will have to pay tolls. Of course, some may take public transportation, others may carpool, and still others may telecommute. A reasonable estimate is that these factors reduce the trips of the "in and out" commuters by 20 percent---thereby reducing our trip estimate to 50,694. Almost 72 percent of those trips currently go through the DTT and a bit more than 28 percent travel through the MTT. Likely, the proportion of trips made through the MTT will increase once the second MTT tube is completed.

How does the number of "in and out" commuters for Portsmouth compare to other Southside cities? Figure 2 illustrates the "in and out" commuters through the DTT and MTT tunnels as a percent of each city's job base---which functions as a rough measure of the size of each city's economy. This provides us with a relative measure that allows us to compare the burden that tolling the DTT and MTT tunnels will have on Portsmouth relative to other cities**.**

[14] Note that these job numbers are lower than those used by Steer, Davies and Greave (SDG) in their work (see footnote 3). For example, SDG report that nearly 1.5 million jobs existed in Hampton Roads in 2009. This is an inflated number. The entire population of the region only approximated 1.7 million in 2009. If one counts all employed individuals in the region, including self-employed and the military, then in 2011 our region could claim only 991,308 jobs (www.bea.gov). The SDG overestimate has consequences for their assessment of the nature of vehicle traffic through the tunnels. SDG assume that 57 percent of all traffic will consist of job commuters; their estimate would be substantially lower if they relied upon more modest job numbers. Because many job commuters are "captives" and must use the tolled paths, an overestimate of their numbers could lead to an underestimate of the sensitivity of regional drivers to the imposition of tolls. Interestingly, SDG's job numbers for Portsmouth, however, are not far off target, according to the U.S. Government's Bureau of Economic Analysis, the recognized authority.

Table 1

Where Workers Live and Where They Work: Hampton Roads 2011

Location of Job	N of Jobs	Gloucester County	Isle of Wight County	James City County	Mathews County	Surry County	York County	Chesapeake	Hampton	Newport News	Norfolk	Poquoson	Portsmouth	Suffolk	Virginia Beach	Williamsburg	Outside Hampton Roads
Gloucester County	13,206	5,550	61	428	665	2	489	116	317	972	127	75	116	99	280	54	3,855
Isle of Wight County	14,025	20	65	455	706	2	520	123	336	1,033	135	80	123	106	297	57	9,968
James City County	37,618	1,363	310	12,055	286	329	2,869	418	1,269	4,827	347	234	356	401	757	1,130	10,668
Mathews County	2,045	267	4	28	711	2	37	22	37	66	13	9	7	9	17	2	815
Surry County	3,113	48	258	115	11	726	89	117	79	171	35	16	50	83	138	11	1,164
York County	28,992	1,695	417	3,388	208	74	6,067	446	2,380	5,347	428	613	428	391	828	526	5,755
Chesapeake	132,806	478	1,441	701	104	70	15	41,070	3,162	3,288	13,226	137	9,498	6,504	30,394	129	22,587
Hampton	76,504	1,130	1,717	1,833	189	30	5,047	3,469	23,816	13,744	3,910	1,634	1,956	2,103	5,088	213	10,625
Newport News	134,154	4,822	4,837	4,463	662	102	10,072	4,819	21,508	40,661	3,973	2,193	3,518	4,659	6,376	463	21,026
Norfolk	192,051	106	1,742	1,334	183	65	1,432	27,297	6,484	5,236	50,825	285	10,249	6,909	52,164	228	27,513
Poquoson	2,410	50	35	40	5	-	291	50	297	344	37	875	32	33	80	3	237
Portsmouth	61,237	131	1,312	255	34	38	304	11,722	1,721	1,881	6,044	44	16,620	5,065	8,466	38	7,561
Suffolk	37,179	222	2,074	333	40	101	368	4,341	885	1,355	1,710	76	3,015	12,107	2,905	29	7,620
Virginia Beach	229,365	612	1,329	1,130	137	-	1,082	25,843	3,631	3,724	23,138	196	6,925	4,790	125,237	215	31,376
Williamsburg	19,123	921	145	5,679	105	174	2,078	205	686	3,162	212	125	196	184	348	1,407	3,496

Sources: Employment data from Bureau of Economic Analysis, www.bea.gov, and include self-employed and military personnel.

U.S. Census Bureau. 2013. OnTheMap Application. Longitudinal-Employer Household Dynamics Program. http://onthemap.ces.census.gov/

http://lehd.ces.census.gov/applications/help/onthemap.html#!what_is_onthemap

In essence, the vertical bars in Figure 2 constitute an economic discomfort index that is comparable across cities. Put differently, the vertical bars provide us with an index of the relative size of the economic costs that the tolling of the DTT and MTT will impose on each of the Southside cities. It is apparent that the relative burden of the tolls is many times greater on Portsmouth and Suffolk than on Norfolk and Virginia Beach.

Table 2

"In and Out" Job Commuters: Portsmouth, 2011

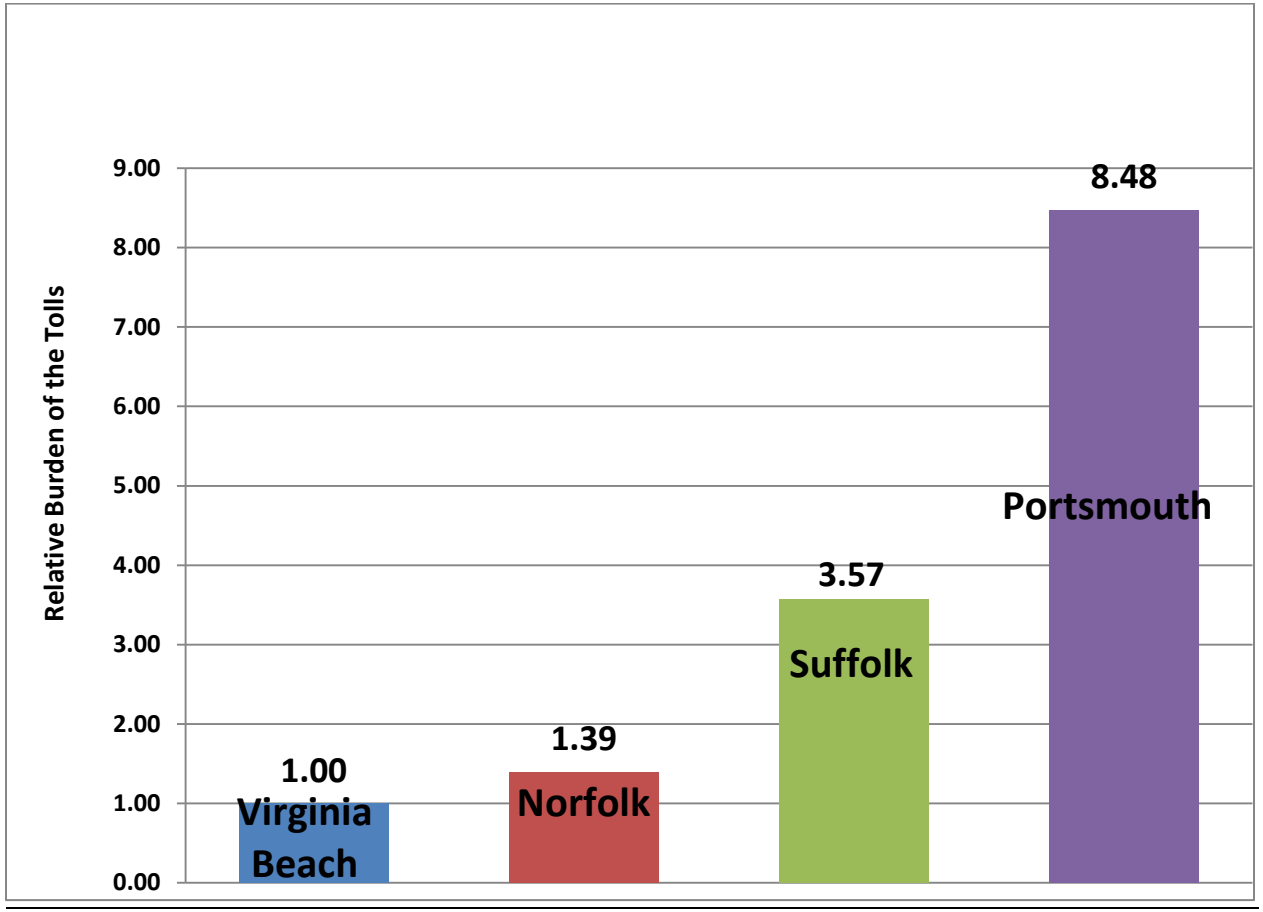
Summary Matrix for Portsmouth 2011				
	Downtown and Midtown Tunnels Only			
	From Portsmouth		Into Portsmouth	
Norfolk	10,249		6,044	
VA Beach	6,925		8,466	
Subtotals	17,174		14,510	
	Sum = 31,684 (32.8% of Portsmouth's population of 96,470			
	and 51.7% of Portsmouth's jobs)			

I noted above in Table 2 that the number of "in and out" commuters through the tunnels for Portsmouth constitutes 51.7 percent of Portsmouth's job base. Relatively speaking, Suffolk is next highest, with 21.8 percent of its job base apparently affected by the tolls. Norfolk, at 8.5 percent, and Virginia Beach, at 6.7 percent, are much less burdened by the DTT and MTT tunnel tolls.

Another way to express these data is to note that Portsmouth's relative burden from the tolls is 8.48 times greater than the relative burden these tolls impose upon Virginia Beach and 6.10 times greater than the relative burden imposed upon Norfolk. Figure 2 expresses reports these ratios, which apply to those who drive through the tunnels. These ratios do not reflect any additional spillover effects, such as the impact of tolls on the prices of goods and services sold in Portsmouth, or assessed property valuations in that city.

Figure 2

Comparing Relative City Burdens from the DTT and MTT Tolls,
Based upon the Percent of Each City's Job Base Affected by the Tolls



Another 18,576 individuals made "in and out" job commuting trips to/from Portsmouth to locations in Hampton Roads other than Norfolk and Virginia Beach (for example, trips to and from Suffolk and Newport News). Only in rare instances will these individuals use the DTT and MTT tunnels to commute to/from their jobs. If these individuals make two trips a day, then they will make an average of 37,152 trips daily. Applying the same 20 percent adjustment for mass transportation, car pools and telecommuting yields an estimated 29,725 toll free "in and out" trips to/from Portsmouth daily from these locations. *It should not escape anyone's attention that tolling the Hampton Roads Bridge Tunnel and Monitor/Merrimac Bridge Tunnel would dramatically accelerate the costs of tolling to the City of Portsmouth (See Appendix B).*

IV. ABILITY TO PAY: A PROBLEM THAT WORSENS OVER TIME

Lenders evaluate prospective borrowers in terms of their ability to service their loans, that is, their ability to repay the loan. While lenders employ a variety of measures to determine who has "the ability to pay," the prospective borrower's income usually is the most important criterion. Lenders do not want to place prospective borrowers in situations where their loan becomes an impossible economic burden because the borrowers' incomes simply are too small to enable them to pay off the loan. Much the same income-related logic applies to the ability of a city's citizens to pay tolls.

What is the ability of the citizens of the City of Portsmouth to pay the tolls that ERCO will charge? How does this ability to pay compare to other cities inside and outside of Hampton Roads? Table 4 examines this issue.

Let's initially focus on the "peak time" toll of $1.84 per crossing. If a job commuter makes this passage two times a day, 250 times per year, then he/she will make 500 passages annually (without considering any other reasons for using the tunnel). 500 x $1.84 = $920 annually. If the same individual also makes four discretionary tunnel passages monthly (this translates to only two "back and forth" tunnel passages monthly), then this will add 48 tunnel passages annually. Let's assume these 48 additional tunnel passages are "non-peak time," and hence cost $1.59 per passage. 48 x $1.59 = $76.32.

Thus, it is reasonable to assume that a typical job commuter traveling "in and out" of Portsmouth (or Norfolk) via the DTT and MTT will spend $996.32 annually on tolls. Note that this computation excludes tolls on the MLK, which could add to this total.

Table 3 reports the relationship between this $996.32 toll payment estimate and median household income in the five major Southside Hampton Roads cities. Note that relatively few residents of Chesapeake will end up paying DTT and MTT tolls.

Table 3 also reveals that a peak time commuter that is a resident of Portsmouth will spend 2.15 percent of the median (50 percentile) household income on tolls. This percentage is exceeded only by Norfolk.[15]

Table 3

Comparing a Typical Job Commuter's Annual Toll Payments ($996)
to the Median Household Income in the Five Major Cities in Southside Hampton Roads

City	Median HH Income, 2012	Tolls as a Percent of Median HH Income
Chesapeake	**$70,244**	**1.42%**
Norfolk	**$44,164**	**2.26%**
Portsmouth	**$46,269**	**2.15%**
Suffolk	**$66,479**	**1.50%**
Virginia Beach	**$65,980**	**1.51%**
Virginia	**$63,636**	**1.57%**

Source of Median HH Income Data: "State and County Quick Facts," U.S. Bureau of the Census, http://quickfacts.census.gov/qfd/states/51/5164000.html.

[15] Moffatt and Nichol, "City of Portsmouth: Policy and Legislative Recommendations for the Midtown and Downtown Tunnels Toll Implementation," August 27, 2012, performed a similar analysis, though with older data. Their recommendations concerning how the City of Portsmouth might rebate toll payments, or diminish their impact, are worthy of consideration. They did not, however, address the state income tax credit option, which I address in a section below.

Cities with many residents living in poverty do not have citizens with the same ability to pay tolls as cities with few citizens living in poverty. Table 4 reports the percent of individuals deemed to be in poverty that were residing in Portsmouth, other Southside Hampton Roads cities, and the Commonwealth of Virginia, in 2012. Roughly one in every six households in Portsmouth fell below the poverty line in 2012. These data underline the relatively larger impact that tolls will have on Portsmouth compared to all other affected cities, save Norfolk.[16]

Whatever the "ability to pay" challenge is today for residents of Hampton Roads with respect to the tolls, their ability to pay nevertheless is quite likely to deteriorate over time. The Comprehensive Agreement permits ERCO to increase tolls by 3.5 percent annually if it chooses to do so; however, if the Consumer Price Index (CPI) increased by more than 3.5 percent in the previous twelve months, then ERCO at its option can increase tolls by the amount of the increase in the CPI. As we will see in a section below, if past experience is an appropriate guide, then this will result in average annual toll increases much larger than 3.5 percent.

How high will the tolls actually be? Beginning in 2016, if ERCO faithfully increases the $1.84 peak time and the $1.59 non-peak time tolls by 3.5 percent annually, then 54 years later (in 2070), these tolls will have increased to $11.79 (peak time) and $10.19 (non-peak time), respectively. For trucks, the peak time and non-peak time tolls increase from $7.36 and $4.77, respectively, to $47.17 and $30.57. Figure 3 illustrates these built-in toll growth patterns.

However, ERCO can choose to increase tolls at the rate of increase of the CPI in the previous twelve months. While I don't own a crystal ball, one can examine the past 54 years of experience (1958 to 2012) to see what rates of price inflation have been in the past. This is probably as reliable a guide as any other metric to what might happen in the future. Between 1958 and 2012, the United States experienced very high rates of price inflation (the CPI rose 13.3 percent in 1979 alone) and slightly negative rates of price inflation (the CPI fell 0.4 percent in 2009).[17]

If the next 54 years of price inflation mirror the past 54 years, then the growth of the CPI will exceed 3.5 percent in 22 of those 54 years. In such years, the tolls will increase at the same rate as the growth in the CPI; that is, more than 3.5 percent annually. This

[16] The ability to pay problem is accentuated by the apparent need of E-Z Pass purchasers to have a credit card. This eliminates the possibility of a purchase via the Internet and will seriously reduce the ability of many households to purchase an E-Z Pass.

[17] ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt.

makes a substantial difference. Now, the peak time and non-peak time tolls for passenger vehicles increase to $21.56 and $18.63, respectively, rather than $11.79 and $10.19. The peak time and non-peak time tolls for trucks increase to $86.24 and $55.29, respectively rather than $47.17 and $30.57. Figure 4 illustrates these differences.

Table 4

Percent of Individuals Deemed to be in Poverty in South Hampton Roads Cities and in the Commonwealth of Virginia, 2012

City	Percent of Individuals Deemed in Poverty, 2012
Chesapeake	**8.3%**
Norfolk	**18.2%**
Portsmouth	**17.5%**
Suffolk	**11.6%**
Virginia Beach	**7.4%**
Virginia	**11.1%**

Source: **"State and County Quick Facts," U.S. Bureau of the Census, http://quickfacts.census.gov/qfd/states/51/5164000.html**

Figure 3

Built-In 3.5% Annual Increases in Peak Time Tolls
For Passenger Automobiles, 2016-2070

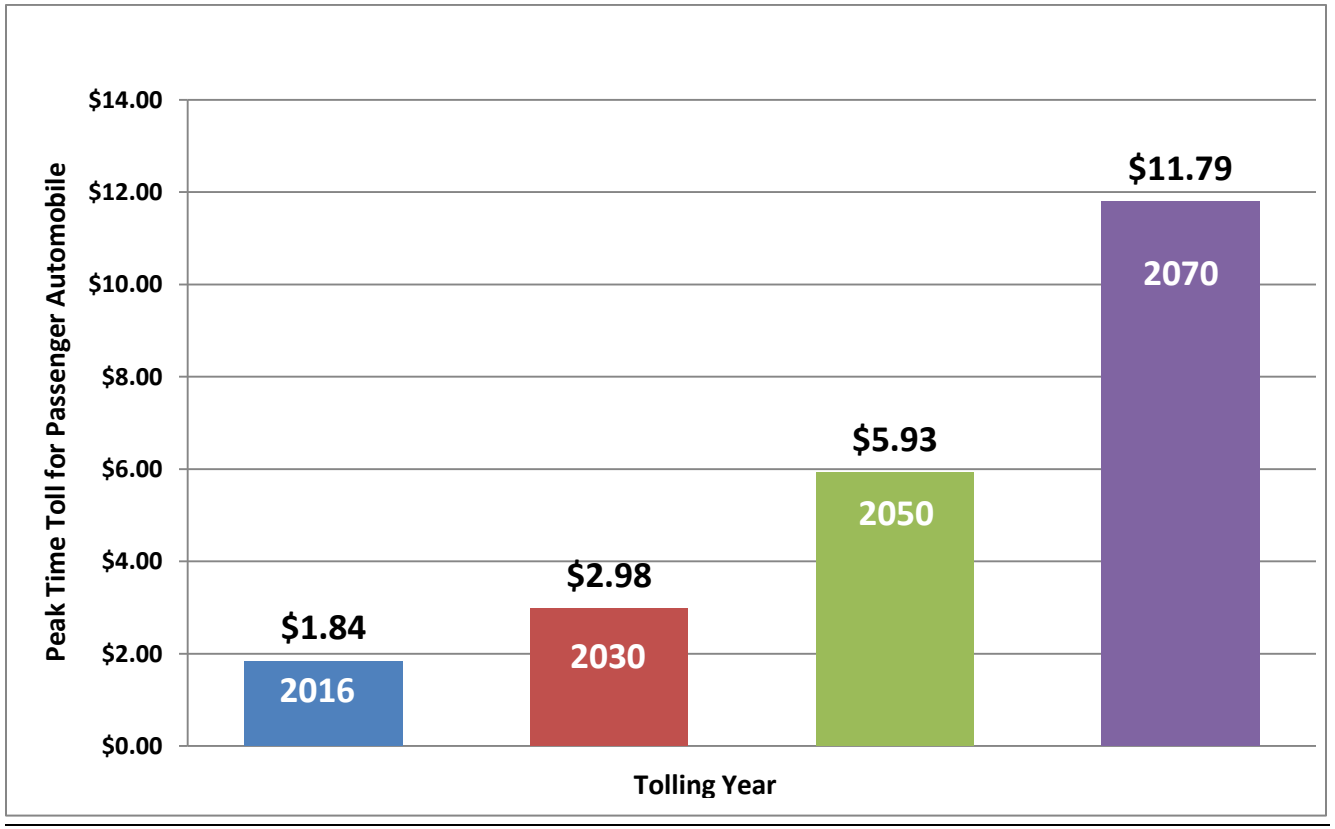
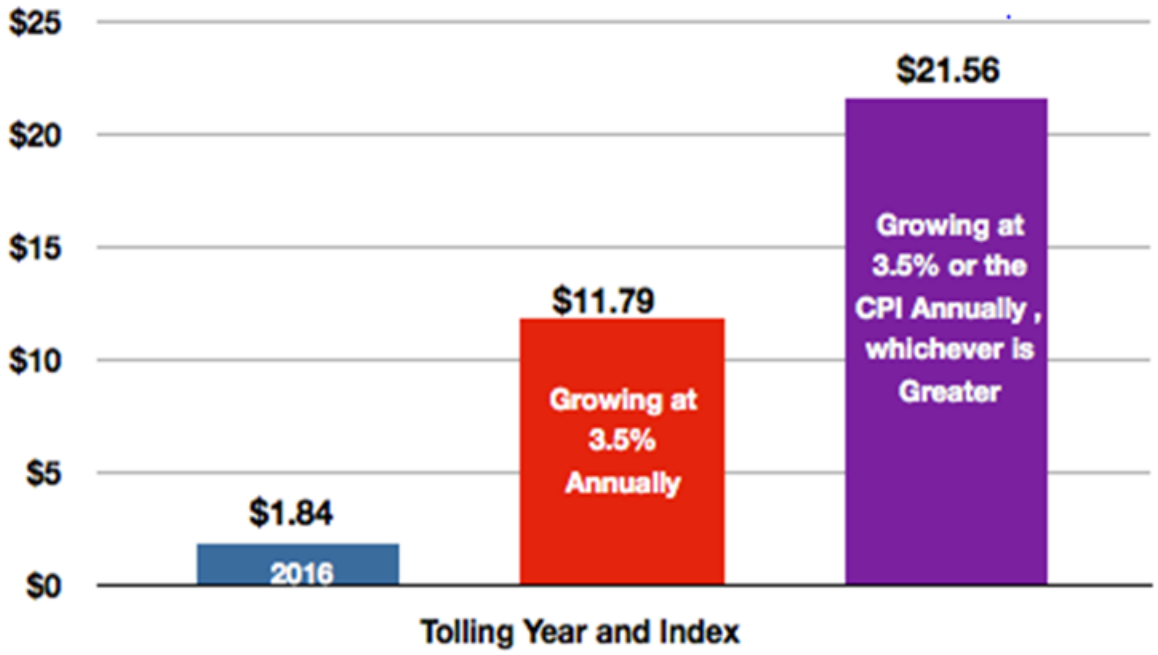


Figure 4

Growth in Peak Time Passenger Automobile Tolls Under the "3.5% or the Growth in the CPI, Whichever is Greater" Scenario



Under this "the future 54 years of the CPI will mirror its past 54 years" scenario, the compound annual rate of growth in tolls will not be 3.5 percent; it will turn out to be 4.66 percent. **Reality is that the real, price-deflated cost of using the tunnels will never decline; that "real price" either will stay constant, or it will increase, in any given year. The year 2016, then, will be the best year the region will ever experience in terms of the actual, "real" price of the tolls. In real, inflation-adjusted terms, the tolls are as inexpensive today as they will ever be until at least 2070.**

Figures 5 and 6 replicate the tolling analysis, but do so for trucks. The peak time tolls for trucks begin at $7.36 in 2016 and grow to $47.17 by 2070. However, under the "3.5% or the Growth in the CPI, Whichever Is Greater" scenario, the peak time truck toll increases to $86.24 in 2070.

It is obvious that the "3.5% or the CPI, whichever is higher" pricing model for tolls will make a huge difference in the tolls drivers pay and the revenue ERCO receives. In 2070, for example, ERCO plausibly will earn 82.8 percent more revenue under this pricing rule than under the simple 3.5 percent rule.

Figure 5

Built-In 3.5% Annual Increases in Tolls for Trucks, 2016-2070

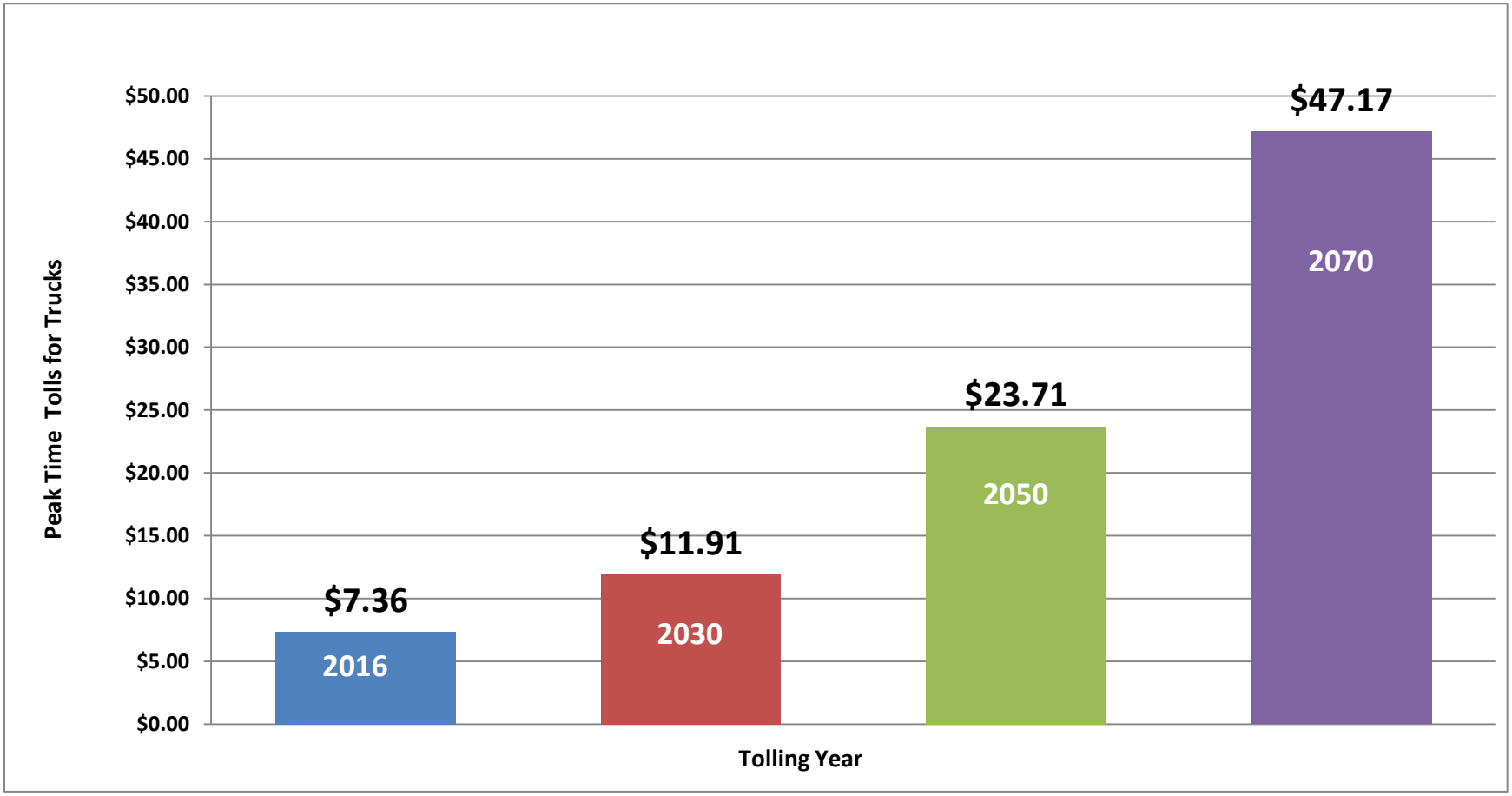
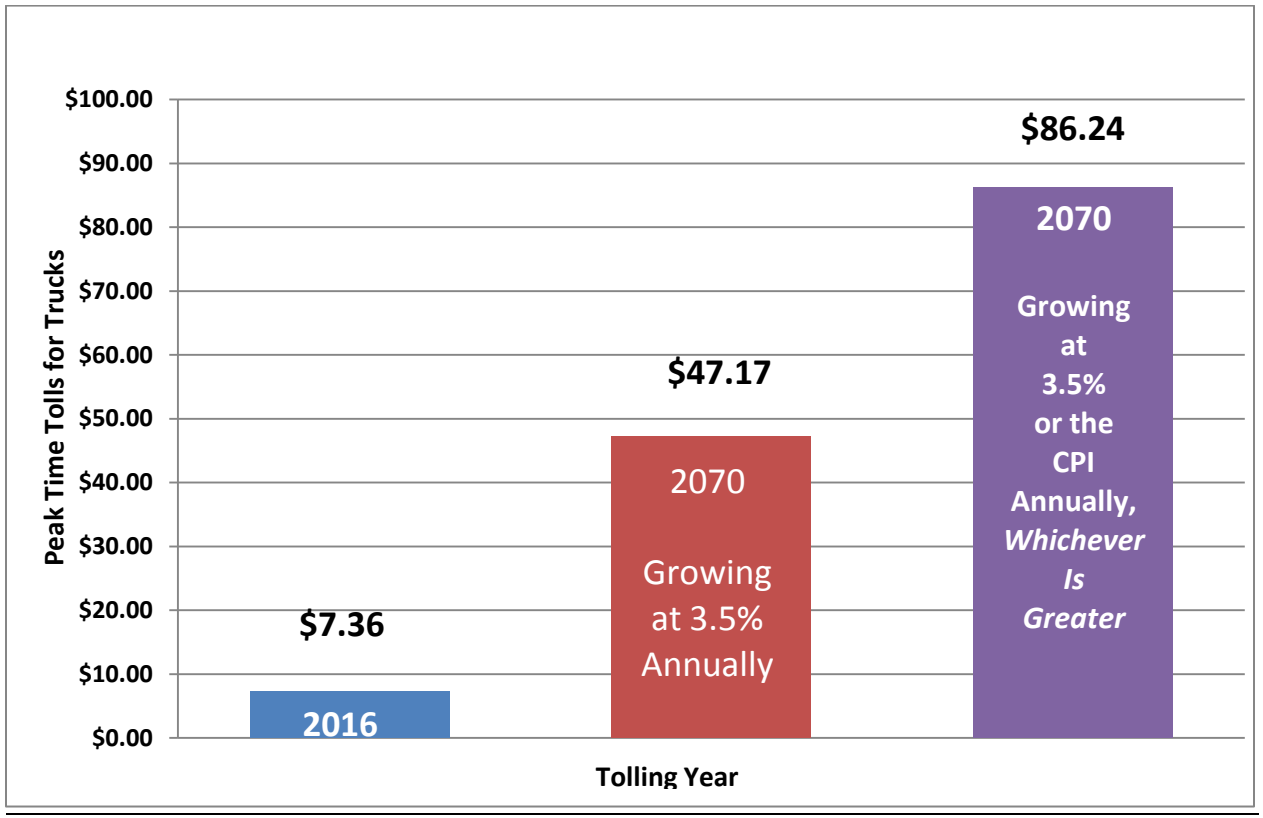


Figure 6

Growth in Peak Time Truck Tolls Under the "3.5% or the Growth in the CPI, Whichever is Greater" Scenario



This is the moral to our story---if the magnitude of the tolls is perceived to be a problem in 2014 or 2016, then that problem will only become larger because the real, price-deflated cost of using the tunnels can only increase. The only question is how much, and the answer to that question depends upon how much price inflation the United States experiences between 2016 and 2070.[18]

V. IMPACTS ON THE PORTSMOUTH BUSINESS COMMUNITY

Unfortunately, there is a tendency for the supporters of toll-financed projects to neglect the costs associated with those projects and for the opponents of toll-financed projects to neglect the benefits of the same projects. Reality is that both benefits and costs are generated by toll-financed projects such as the DTT/MTT/MLK undertaking in Hampton Roads.

Let's focus for a moment upon the primary benefits typically associated with a new toll project:

- Reduced travel times
- Increased trip and travel reliability
- Reduced traffic congestion
- Increased fuel economy
- Reduced vehicle operating costs
- Reduced carbon emissions and diminished environmental harm
- As many as 1,500 additional jobs and associated increased incomes connected to construction

At least five reputable studies have documented that some or all of these benefits will be associated with the DTT/MTT/MLK tolling project. For example, the Hartgen Group estimates that after completion, the project will increase the gross regional product of Hampton Roads by an incremental $365 million to $390 million annually and in the process create 4,401 additional jobs.[19] "West Side" benefits that will accrue are estimated by Hartgen to range between $144 million and $148 million, along with 1,736 jobs.

[18] This will occur when the actual growth in the CPI in a year is less than 3.5 percent. In this case, tolls will go up 3.5 percent annually anyway, increasing their real cost.

[19] "Impacts of Mid-Town Tunnel Improvements on Regional Productivity and Job Mobility," The Hartgen Group (2009), p. 3, www.hartgengroup.net.

The Hartgen Group also estimates that the increased reliability of travel across the Elizabeth River will have a median value of $63 million to the region.[20]

There are many additional benefit estimates. I supply some of these here not because I have the immediate ability to verify them and not because I endorse their specific estimates. Instead, I take note of them to demonstrate that reputable analysts attribute significant financial benefits to the completion of the DTT/MTT/MLK project. It is fair to say that the analytic consensus is that the project will yield significant benefits to the region and the Commonwealth.

This is despite the fact that ERCO and its stockholders presumably will extract large amounts of revenue from the region between now and 2070. Steer, Davies and Gleave forecast total DTT/MTT/MLK toll revenues of $139.5 million in 2034, $173.7 million in 2050, and $201.4 million in 2069. What is not clear is how much of this revenue will leave Hampton Roads (and Portsmouth).[21] This must be considered in any regional benefit/cost analysis.

Clearly, the City of Portsmouth will derive benefits from the project. The immediate problem is that these studies do not address Portsmouth specifically. Further, Portsmouth represents a distinctive case for three reasons: (1) the proportionate size of Portsmouth's "in and out" job traffic through the tunnels exceeds that of any other affected city; and, (2) the benefits and costs of the project will not be evenly distributed across the City and its citizens; and, (3) the economic burden of the tolls on the median Portsmouth household is significantly higher than for other cities such as Chesapeake, Suffolk, and Virginia Beach (though roughly similar in this regard to Norfolk). Tables 4 and 5 specifically address point (3).

[20] "Value of Improvements in the Reliability of Travel Time resulting from MTT Improvements," The Hartgen Group (2009), p. 2, www.hartgengroup.net.

[21] It is almost impossible to estimate the size of this revenue transfer outside of the region unless one knows how many employees will be hired in Hampton Roads, how much they will be paid; how many local suppliers will be utilized, etc.

How Do the New Tolls Compare to Those That Existed in the 1980s? Since the $.25 passenger vehicle toll was eliminated in August 1986 (See Bill Sizemore, "Tolls Are Ingrained in Hampton Roads History," *Virginian-Pilot*, April 2, 2012, www.pilotonline.com), the Consumer Price Index for all urban consumers has risen 112.46 percent (www.bls.gov). The equivalent toll in 2013 prices is $.53. Thus, even the "off-peak" tolls that will be applied to passenger vehicles at the DT and MT tunnels will be substantially higher than those that prevailed previously.

Let's consider a specific example that will illustrate how some Portsmouth citizens and businesses will be affected far more than others by the tolls. Downtown Portsmouth and the Olde Towne area boast many restaurants that attract significant portions of their clientele from outside of the City. Tolls might well make a difference in their patronage. Some might argue that tolls that will account for only five to ten percent of a restaurant tab are not sufficiently significant to make a difference. This, however, represents a misunderstanding of their situations.

Independent of the tolls, suppose the City of Portsmouth decided to impose a five or ten percent meal tax that applied only to restaurants in the Downtown/Olde Towne area. Such a tax would be regarded by many observers as unwise, excessive, and unfair, not the least because it would push patrons to other restaurants, some of which are not even located in Portsmouth.

How sensitive are drivers of vehicles to the imposition of new tolls? Past studies suggest that the long-term price elasticity of demand for tolled travel is about -.3. This means that a ten percent increase in an existing toll eventually will evoke a three percent decline in tunnel vehicle traffic (holding other things constant such as income and employment. However, the DTT/MTT/MLK situation is different for two reasons: (1) these facilities are not currently tolled; and, (2) except for the MLK, there are no good substitute travel paths available. Use of alternate, non-tolled routes will increase travel time by approximately 30 minutes. This suggests that price sensitivity will be reduced in this tolled situation---unless we are talking about discretionary travelers (shoppers, diners, church goers, social visitors, etc.). Steer, Davies and Greave (see footnote 3, their p. 88) believe that during the first six months, traffic on the newly tolled routes may decline as much as 24 to 48 percent. My own estimate of the initial "shock effect" is lower than this because of the just mentioned absence of viable, non-tolled alternative routes for job commuters. Nevertheless, make no mistake, there will be a visible initial "shock effect" associated with the tolls and it could be substantial (10 to 25 percent). Portsmouth businesses that cater to discretionary customers should prepare themselves for this eventuality. It won't last forever, but it will hurt.

Contemporary evidence on the "price elasticity of demand" (price sensitivity) of diners for restaurant meals suggests that a ten percent increase in restaurant meal prices will lead to an eight to twelve percent decline in restaurant patronage. Therefore, the hypothetical I just talked about would damage any restaurant that had to pay the tax. Unfortunately, this is essentially the same effect the tolls will have. Restaurants with clienteles involving guests from Norfolk and Virginia Beach will suffer. Those restaurants serving a predominantly "local" clientele (such as a typical McDonald's) will not.

Next, consider the example of a Portsmouth business that sells to customers located in Norfolk and hence must use the DTT and MLK tunnels to pick up and deliver its products. To these businesses, the tolls represent a cost increase that either will be passed on to their customers, or it will result in their reduced profitability. Suppose this business must send a delivery truck to Norfolk twice a day (morning and afternoon) to supply its customers. This means our hypothetical business will pay $7.36 x 4 = $29.44 in tolls every

day. If it does this six times a week, 52 weeks a year, then it will incur the $29.44 expense 312 days annually. Hence, $29.44 x 312 = $9,185. This is not a throw-way number and illustrates that an expense that may appear to be a minor consideration to someone on a single day nevertheless will become an important consideration on an annual basis.

The potential injury does not stop there. The City of Portsmouth receives 1.0 percent of covered sales as a part of the Commonwealth's local option sales tax. In the example above, the tolling costs the City $91.85 in sales tax collections.

In the long-run, the DTT/MTT/MLK project may spur business and economic development in Portsmouth and therefore this will increase the City's sales tax collections. The short-run result, however, is much more likely to be negative, especially in certain parts of the City and particularly for certain types of businesses that sell to discretionary customers who easily could instead choose to patronize a business not affected by tolls.

The sales tax stakes actually are large. In 2012, the City recorded $594.92 million in taxable sales.[22] One percent of those taxable sales is $5.95 million. If, as Steer, Davies and Greave assume, that the initial onset of tolls will decrease traffic volumes through the tolled areas by 24 to 48 percent,[23] then the blow to Portsmouth's tax collections could be several million dollars. True, most of this negative response will dissipate as time passes, but revenue collections could suffer for the first year or two.

The salient point of the previous example is that the costs of the tolling will not be evenly felt across the region, or the City of Portsmouth. Those individuals who must commute via the DTT/MTT/MLK complex will, as we have seen, pay approximately $1,000 per year to do so. Businesses either that attract patrons via these travel paths, or use the DTT/MTT/MLK paths to sell to their customers, will also be injured.

There is yet another possible economic effect to consider that could affect businesses, homeowners, and the City. At least initially, property values could be affected adversely by the tolls. Consider a simple illustration. If the tolls are viewed as a tax on activity relating to the City of Portsmouth, then this will reduce property values, holding other things constant. Economists calculate the value of a business as the present value of the future stream of profits of that business. If that future stream of profits is diminished

[22] Taxable sales data supplied by the City of Portsmouth.
[23] See footnote 3, p. 88.

for whatever reason, then the value of the business declines. Hence, the property and location of the business become worth less than before. Connected to this, at least initially, the tolls will exert modest downward pressure on some home values in Portsmouth.[24]

The current assessed valuation of land and buildings in Portsmouth is $7.17 billion and the tax rate is $1.27 per $100 of assessed value.[25] Portsmouth's 2014 budget forecasts $88.37 million in "real property" revenue, down about three percent from actual 2012 collections.[26] Even a small percentage change in assessed valuations could have a large quantitative impact upon the budget of the City of Portsmouth. Just a two percent decline in assessed valuations, for example, would cost the City of Portsmouth $1.76 million annually.

Will the potential financial benefits generated by the project within the City of Portsmouth exceed the potential costs just outlined? The truth is that the answer to this question really is not clear today and the answer will not be known with certainty for approximately another decade. An important reason why this is true is that Portsmouth's situation is distinctive within the region where the tolls are concerned. Therefore, one cannot infer the answer from the studies that have been performed thus far.

We can, however, say two things with confidence: (1) the benefits and costs of the DTT/MTT/MLK project will be unevenly distributed among the cities of Hampton Roads; and, (2) some citizens and businesses inside each of the cities will be affected much more than others. Thus, what is true for, say, a resident of Newport News or Virginia Beach, will not necessarily hold true for a resident of Portsmouth.

[24] Some homes could become more valuable if they are propitiously located and their residents easily can access the DTT/MTT/MLK pathways. Others, however, will decline in value if prospective owners view the tolls as a form of tax on activity in Portsmouth without compensating locational advantages.
[25] Assessed valuation data and tax rate supplied by the City of Portsmouth.
[26] City of Portsmouth General Fund Budget for Fiscal Year 2014, www.portsmouthva.gov.

VI. IMPACTS ON LARGELY DISCRETIONARY TRAVELERS (NON-COMMUTERS, NON-BUSINESS) INCLUDING THOSE TRAVELING FOR SOCIAL, RECREATIONAL, OR RELIGIOUS PURPOSES, AS WELL AS TRANSIENTS

Let's now return to the issue of discretionary travelers---those drivers of vehicles who don't have to use the DTT/MTT/MLK pathways to get to their jobs, or to transact business with their customers. Table 5 parses the data we have available concerning tunnel vehicles and provides estimates of the nature of these vehicles. We do know, for example, that a daily average of about 89,500 vehicles use the DTT and about 35,000 the MTT.[27] We can extract the number of job commuters in and out of the region's cities and after adjusting for their use of mass transit, car pools, and telecommuting, we can estimate how many vehicles actually involve job commuters.

The remaining slices of the vehicle pie are not so precise. Most of the studies of the project have assumed that only four percent of vehicles transiting the tunnels are trucks. This impressed me (and others) as a rather low percentage and so my staff actually counted the proportion of vehicles entering the MTT that either are trucks, conventionally defined, or business vehicles (such as panel trucks with a business name on the side). During some hours (for example, between 9:00 a.m. to 10:00 a.m. on a weekday), as many as 32 percent of all vehicles entering the tunnels are business vehicles. This led us to the conclusion that almost one in five vehicles transiting the tunnels overall has a business purpose for its travel throughout a typical week.

This still leaves, however, approximately 35,000 daily users of the DTT and more than 14,000 users of the MTT tunnel whose travel is discretionary, or whose purpose(s) we don't know. It would be delightful if we knew the purpose and/or destination of these vehicles; however, we don't. What we do know is that they are unlikely to be job commuters or business-oriented vehicles.

What makes these approximately 50,000 users of the DTT/MTT/MLK especially relevant is their largely discretionary use of these pathways. Because they usually do not have to use these pathways, or can choose to delay their passage, or even decide to travel a longer, alternative path, they are likely to be the most price-sensitive drivers. These are the drivers that ought to be of the greatest concern to ERCO because they will have the greatest marginal influence upon its revenue collections. They also are the drivers that should be of the greatest concern to downtown restaurants and businesses with regional clienteles.

[27] Virginia Department of Transportation and Steer, Davies and Greave (see footnote 3).

Table 5

Estimating the Sources and Purposes of Daily Trips
Through the Downtown Tunnel (DTT) and Midtown Tunnel (MTT)

	Downtown Tunnel (DTT)	Midtown Tunnel (MTT)
Total Average Daily Trips	**89,500**	**35,000**
Job and Business Related		
Job Commuting to and from Norfolk or Virginia Beach	**36,445**	**14,251**
Business Trips	**17,500**	**6,800**
Discretionary Trips		
Retail Shopping, Restaurants, Recreation, Social, Transients, Education, Church, Airport, etc.	**21,000**	**7,000**
Other/Unknown	**14,555**	**6,949**

If these discretionary drivers really are quite price sensitive, then the initial negative impact (perhaps up to three years according to studies of similar situations) of the tolls on Portsmouth is going to be significant. If, as Steer, Davies and Greave suppose, the initial shock of the tolls reduces tunnel travel by 24 to 48 percent---and their higher bound 48 percent estimate turns out to be reality---then it is these discretionary drivers that will cause this to be so. Many individuals and businesses in Portsmouth will

not be affected by such a reaction, but the restaurants and businesses with regional clienteles beyond Portsmouth certainly will be damaged. (And, so will their employees.)

The primary mitigating factor here in terms of an initial "shock effect" is the absence of meaningful alternative routes for drivers. A driver who decides not to use the tunnels probably will add about 30 minutes to his/her trip each way. Once this reality penetrates, I expect to see visible increases in tunnel usage by discretionary drivers. Even so, those restaurants and businesses with truly regional customer bases may never recover completely. For them, it will be as if a five to ten percent sales tax has been imposed upon them, but not on firms whose customers don't use the tunnels. This easily could result in a three to eight percent decline in patronage for them in the long-run.

Finally, I alluded earlier to my feeling that the future traffic estimates that ERCO has developed (buttressed by the studies I have mentioned) are optimistic. Most of these studies were completed before the future path of defense spending (which constitutes 46 percent of our regional economy) became evident. We now know that the absolute level of defense spending in Hampton Roads declined slightly in 2013 and that absent another war or major conflict, this may be the high water mark for us for several years.[28] At the very least, we now know that the generous compensation increases that active duty and civilian Department of Defense personnel received since 2001 are not going to continue. We also now know that our region has experienced net outmigration of citizens for the last several years. Further, as Figure 9 in Appendix C reveals, bridge and tunnel traffic volumes now have been stagnant for almost a decade in Hampton Roads.

All of this adds up to rather modest expectations for economic and population growth in Hampton Roads for the remainder of this decade. This may make it difficult to ERCO to meet its traffic and revenue projections. One might be inclined to say, "Well, that's not my problem; it's their problem." However, it seems likely this will place upward pressure on tolls and could as well impact the quality and breadth of services received. In fact, it is the long-term best interests of the City of Portsmouth to have the tunnel succeed and for tunnel traffic to exceed projections.

[28] See the *State of the Region Report, 2013* (Norfolk: Old Dominion University).

Suppose the typical driver values his/her time at $10 per hour (which is less than Steer, Davies and Gleave assume). Then, the cost of a half-hour delay to that driver in order to avoid paying a toll is $5. This is higher than the toll ($1.84 at peak time) and so an economist would predict that the typical driver will choose to pay the toll rather than drive the longer, alternate route. But, this might not happen immediately.

VII. ALTERNATE WAYS TO REDUCE THE POSSIBLE NEGATIVE IMPACT OF THE TOLLS

The optimal solution for the City of Portsmouth is for the Commonwealth to allocate additional funds to the DTT/MTT/MLK project (cash or debt) that can be used either to diminish the level of tolls throughout their existence, or to delay their onset. At the same time, however, Portsmouth would be wise to consider other ways that might diminish the financial impact of the tolls on its citizens and businesses. Among the most attractive candidates are these:

- Subsidizing or rebating portions of tolls paid by Portsmouth citizens or employees. Moffatt and Nichols' 2012 useful report to the City focused on ways that the City itself might subsidize or rebate toll payments.[29] To this, the City ought to add the possibility of a state income tax credit for cumulative tolls paid above a certain level, say, $250 annually. This tax credit easily could be tied to the size of someone's taxable income in order to focus it upon lower income individuals and households. Yes, this constitutes a drain on the Commonwealth's treasury, but it is a much smaller one than, say, a request for an additional $50 million in cash or debt contribution by the Commonwealth to the project. It also has the merit of having its impact distributed over time. For that matter, the City of Portsmouth could rebate property taxes and the like on much the same basis.

[29] "City of Portsmouth Policy and Legislative Recommendations: Midtown and Downtown Tunnel Toll Implementation," Moffatt and Nichols, August 27, 2012.

- Additional tolling time periods. Figures 7 and 8 illustrate the highly variable nature of vehicle traffic through the DTT and MTT on weekdays. Similar, but accentuated patterns exist on weekends. ERCO has responded to these data by developing a two time period model---peak time and non-peak time in terms of the tolls it will charge. Why shouldn't more than two tolling time periods exist? Experience at other toll sites nationally suggests four distinct tolling time periods may be optimal.

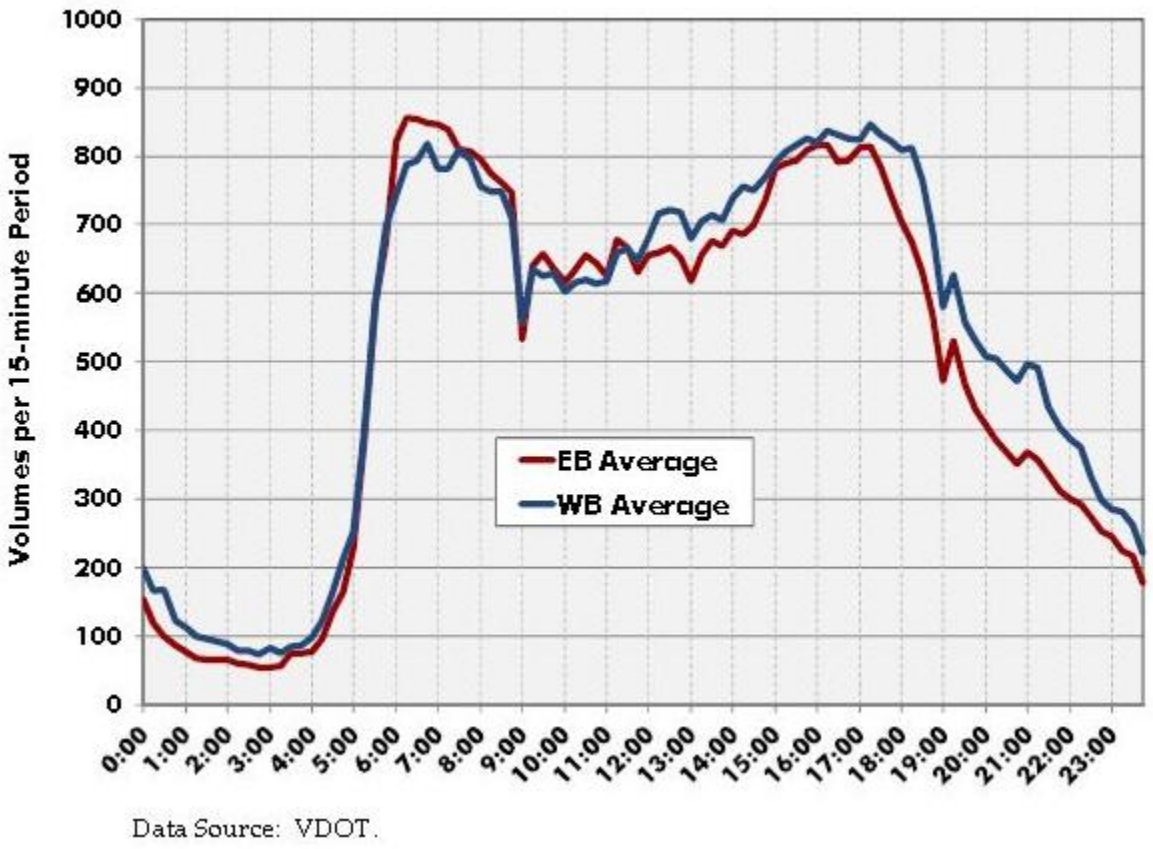
  Will the additional tolling time periods cost ERCO revenue? Not if they attract additional discretionary vehicles that otherwise would not use the DTT/MTT/MLK. Literally, what is required is that the demand for tolled travel be "unit elastic" or better. This means that a ten percent reduction in tolls must result in at least a ten percent increase in toll customers, or a twenty percent reduction in tolls resulting in at least a twenty percent increase in toll customers.

  At the very least, the City ought to request ERCO to experiment with additional tolling time periods to see what the reaction of drivers is. The aim is to attract discretionary drivers (for example, those who might patronize a store or restaurant, attend church, or visit friends) who otherwise would forgo driving through the DTT/MTT/MLK. Substantially lower fares in clearly "off peak" time periods would improve the lives of citizens and reduce congestion during peak load times as well.

- Enhanced public transportation. The City already has given considerable thought to this issue and hence I will discuss it only briefly. Improved bus and ferry transportation, the facilitation of car pools---the City might do more to publicize HRT's not widely known Traffix web site (www.gohrt.com/services/traffix), where prospective car poolers can make contact with each other.

Figure 7

Downtown Tunnel Weekday Traffic Volumes by Time of Day (2009)

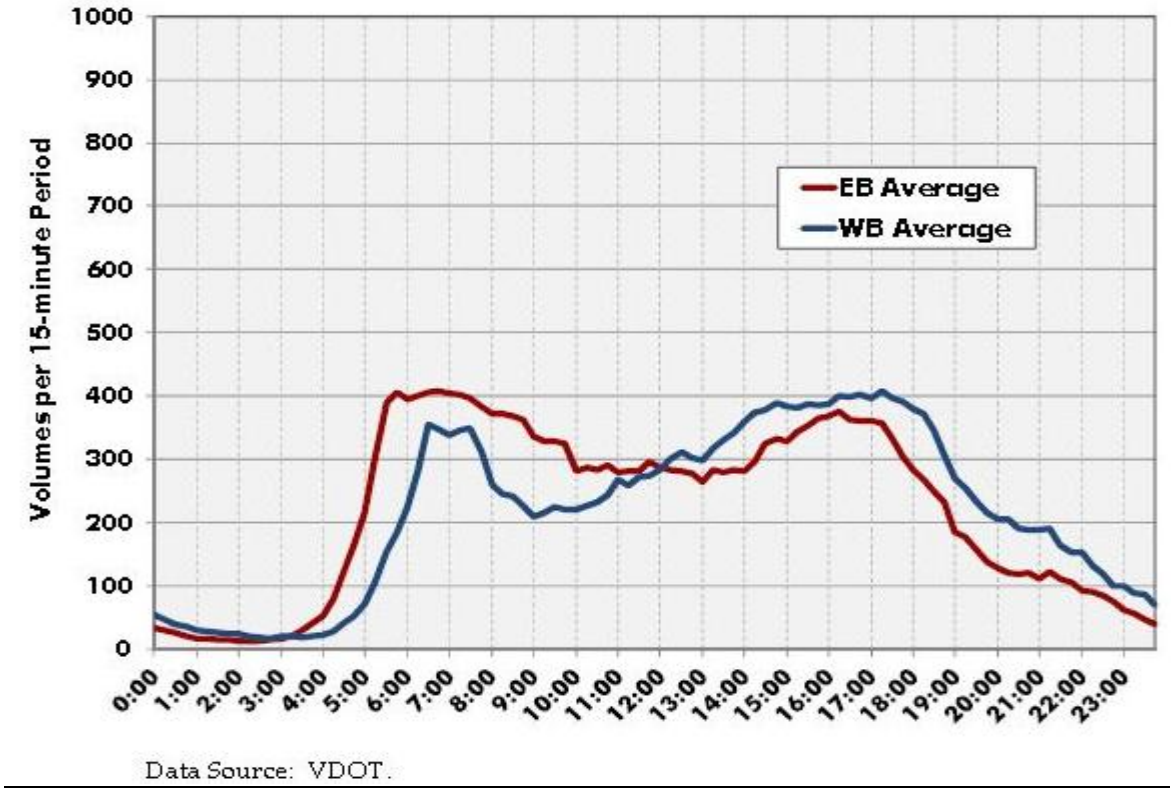


Note: EB = East Bound, WB = West Bound.

Source: "Hampton Roads Congestion Management Process," Hampton Roads Transportation Planning Organization, September 2010, Figure 5, p. 12.

Figure 8

Midtown Tunnel Weekday Traffic Volumes by Time of Day (2009)



Note: EB = East Bound, WB = West Bound.

Source: "Hampton Roads Congestion Management Process," Hampton Roads Transportation Planning Organization, September 2010, Figure 8, p. 13.

APPENDIX A

Home Residence of the Worker

Location of the Job	N of Jobs	Gloucester	Isle of Wight County	James City County	Mathews County	Surry County	York County	Chesapeake	Hampton	Newport News	Norfolk	Poquoson	Portsmouth	Suffolk	Virginia Beach	Williamsburg	Outside Hampton Roads
Gloucester	13,206	42.03%	0.46%	3.24%	5.04%	0.01%	3.70%	0.88%	2.40%	7.36%	0.96%	0.57%	0.88%	0.75%	2.12%	0.41%	29.19%
Isle of Wight County	14,025	0.15%	30.41%	1.30%	0.27%	2.28%	1.17%	3.90%	5.75%	9.84%	2.03%	0.26%	5.21%	13.09%	2.09%	0.15%	22.08%
James City County	37,618	3.62%	0.82%	32.05%	0.76%	0.88%	7.63%	1.11%	3.37%	12.83%	0.92%	0.62%	0.95%	1.07%	2.01%	3.00%	28.36%
Mathews County	2,045	13.05%	0.18%	1.35%	34.74%	0.09%	1.80%	1.08%	1.80%	3.24%	0.63%	0.45%	0.36%	0.45%	0.81%	0.09%	39.87%
Surry County	3,113	1.53%	8.30%	3.71%	0.36%	23.34%	2.86%	3.75%	2.54%	5.48%	1.13%	0.52%	1.61%	2.66%	4.43%	0.36%	37.40%
York County	28,992	5.85%	1.44%	11.69%	0.72%	0.26%	20.93%	1.54%	8.21%	18.44%	1.48%	2.11%	1.48%	1.35%	2.86%	1.81%	19.85%
Chesapeake	132,806	0.36%	1.08%	0.53%	0.08%	0.05%	0.01%	30.93%	2.38%	2.48%	9.96%	0.10%	7.15%	4.90%	22.89%	0.10%	17.01%
Hampton	76,504	1.48%	2.24%	2.40%	0.25%	0.04%	6.60%	4.53%	31.13%	17.97%	5.11%	2.14%	2.56%	2.75%	6.65%	0.28%	13.89%
Newport News	134,154	3.59%	3.61%	3.33%	0.49%	0.08%	7.51%	3.59%	16.03%	30.31%	2.96%	1.63%	2.62%	3.47%	4.75%	0.34%	15.67%
Norfolk	192,051	0.06%	0.91%	0.69%	0.10%	0.03%	0.75%	14.21%	3.38%	2.73%	26.46%	0.15%	5.34%	3.60%	27.16%	0.12%	14.33%
Poquoson	2,410	2.08%	1.44%	1.66%	0.21%	0.00%	12.07%	2.08%	12.34%	14.26%	1.55%	36.32%	1.34%	1.39%	3.31%	0.11%	9.83%
Portsmouth	61,237	0.21%	2.14%	0.42%	0.06%	0.06%	0.50%	19.14%	2.81%	3.07%	9.87%	0.07%	27.14%	8.27%	13.82%	0.06%	12.35%
Suffolk	37,179	0.60%	5.58%	0.90%	0.11%	0.27%	0.99%	11.68%	2.38%	3.64%	4.60%	0.20%	8.11%	32.56%	7.81%	0.08%	20.50%
Virginia Beach	229,365	0.27%	0.58%	0.49%	0.06%	0.00%	0.47%	11.27%	1.58%	1.62%	10.09%	0.09%	3.02%	2.09%	54.60%	0.09%	13.68%
Williamsburg	19,123	4.81%	0.76%	29.70%	0.55%	0.91%	10.87%	1.07%	3.59%	16.54%	1.11%	0.65%	1.02%	0.96%	1.82%	7.36%	18.28%

APPENDIX B

Suppose that the Hampton Roads Bridge Tunnel (HRBT) and the Monitor Merrimac Memorial Bridge Tunnel (MMMBT) are tolled in addition to the DTT and MTT tunnels. The table below illustrates how this would affect the City of Portsmouth if current commuting patterns continued. The graph below illustrates how this substantially increases the impact of tolls on three major Southside cities. Whereas tolling only the DTT and MTT tunnels would impact commuters accounting for 51.7 percent of Portsmouth's job base, this rises to 72.8 percent when all bridges and tunnels are tolled.

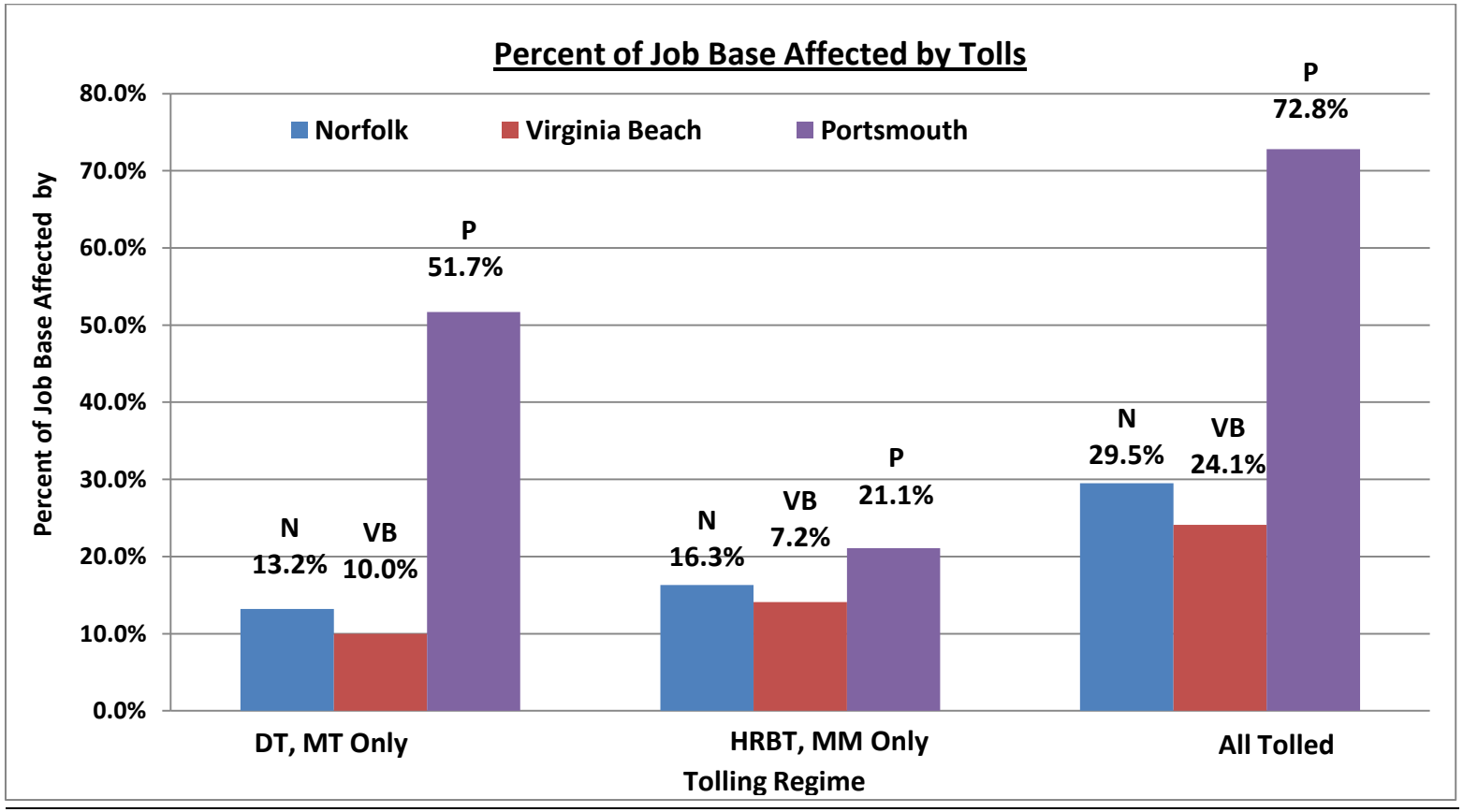
Summary Matrix for Portsmouth 2011

	Downtown and Midtown Tunnels Only		
	From Portsmouth		Into Portsmouth
Norfolk	10,249		6,044
VA Beach	6,925		8,466
Subtotals	17,174		14,510

Sum = 31,684 (32.5% of Portsmouth's population of 96,470 and 51.7% of Portsmouth's 61,237 jobs)

	Possible Peninsula Tolled Locations		
Gloucester	116		131
James City	356		255
Mathews	7		34
York	428		304
Hampton	1,356		1,721
Newport News	3,518		1,881
Poquoson	32		44
Williamsburg	196		38
Outside H.R.	NA		1,890
Subtotals	6,609		6,298
	Sum = 12,907 (13.4% of Portsmouth's population of 96,470 and 21.1% of Portsmouth's 61,237 jobs)		
Grand Totals	23,783		20,808
	Sum = 44,591 (46.3% of Portsmouth's population of 96,470 and 72.8% of 61,237 Portsmouth's jobs)		

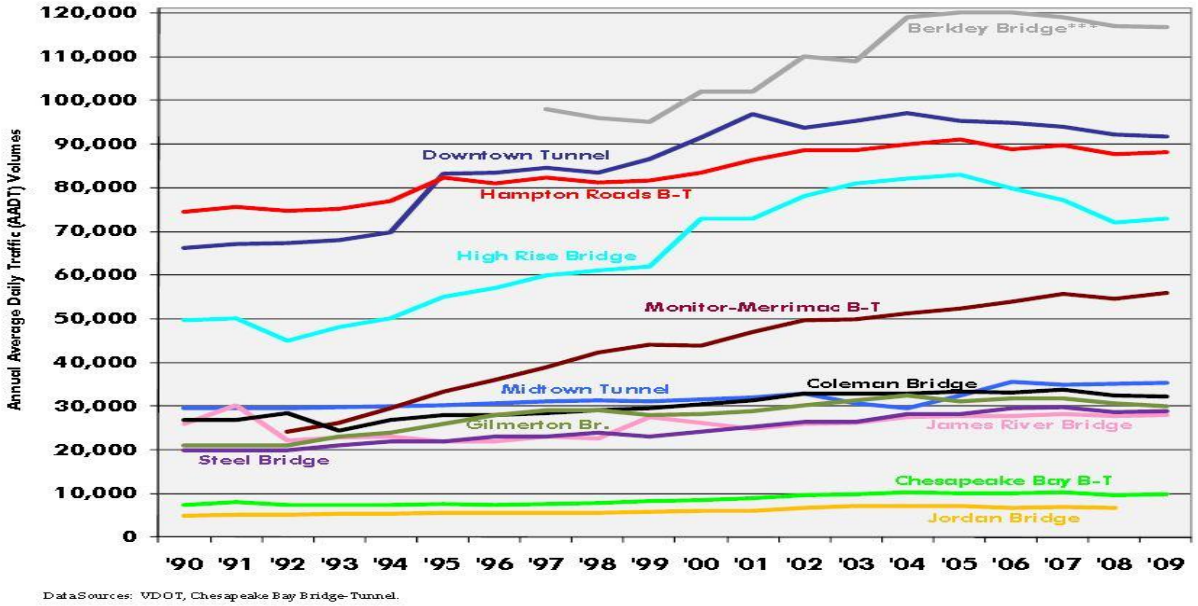
Note: No tolling arrangement would affect Chesapeake, Franklin, Isle of Wight, or Suffolk insofar commuting to Portsmouth is concerned.



Some may argue that tolling the two James River bridges *"won't happen."* Perhaps they are correct. However, it is difficult to see how the Commonwealth and the region will be able to finance either a third crossing or for an expansion of the HRBT without tolls. If the region is willing to forgo a third crossing and/or HRBT expansion, then it can avoid tolling the HRBT and MMMBT. On the other hand, if the region is insistent that these improvements occur, then tolling at least the HRBT and MMMBT seems almost unavoidable unless the Commonwealth's transportation funding changes significantly.

Appendix C

Daily Traffic Volumes on Bridges and Tunnels in Hampton Roads, 1990-2009



Source of Graph: "Hampton Roads Congestion Management Process," Hampton Roads Transportation Planning Organization, September 2010, Figure 2, p. 10.

END